

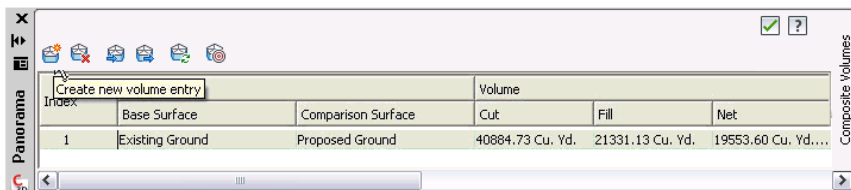
## AutoCAD Civil 3D: Calculating Earthwork for Improved Design and Construction

A feature within AutoCAD Civil 3D allows for the calculation of earthwork required on a project. This is useful for both design and construction. In design, the land development and engineering firms optimize earthwork by reducing the amounts of cut and fill needed. In construction, this information can help with scheduling, estimating and sequencing.

To calculate the required earthwork, the information is needed for both the current graded surface and the future (proposed) graded surface. These can be calculated using contour data and will not be discussed explicitly in this Wiki.

With your two surfaces, the process of calculating earthwork begins by clicking Surfaces on the Modify tab. Alternatively, you can also just click on a surface in the drawing. Either of these methods displays the Surfaces tab on the ribbon. On the Analyze panel of the Surfaces tab, click Volumes.

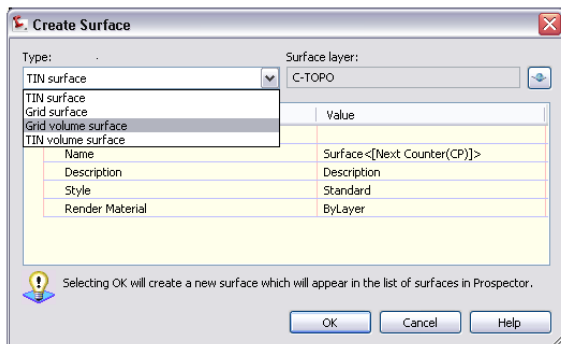
The Panorama is displayed. You first create a new volume entry in the list by clicking the Create New Volume Entry icon (upper left corner of the Panorama window). Then click in the cell under Base Surface and select the starting surface, select a surface in the cell under Comparison Surface to select your finishing surface. In a few seconds, AutoCAD Civil 3D performs a composite calculation between the two surfaces and displays the result.



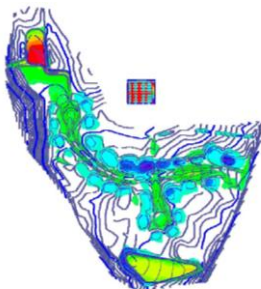
The screenshot shows the 'Panorama' window in AutoCAD Civil 3D. It contains a table for volume calculations. The table has columns for 'Index', 'Base Surface', 'Comparison Surface', 'Cut', 'Fill', and 'Net'. A single entry is shown with 'Existing Ground' as the base surface and 'Proposed Ground' as the comparison surface. The results are: Cut = 40884.73 Cu. Yd., Fill = 21331.13 Cu. Yd., and Net = 19553.60 Cu. Yd....

Index	Base Surface	Comparison Surface	Cut	Fill	Net
1	Existing Ground	Proposed Ground	40884.73 Cu. Yd.	21331.13 Cu. Yd.	19553.60 Cu. Yd....

You can still perform an earthwork calculation using multiple methods, as in Land Desktop. The two possible methods are Grid and Composite. You can perform these types of calculations just as easily in AutoCAD Civil 3D as in Land Desktop. It is no more difficult than creating a new Volume surface. These types of surfaces (Grid Volume Surface and TIN Volume Surface) are created using the same tool as a regular surface. Rather than specifying components like Point Group and Contour Data as data types to build the surface, you need only select two surfaces to compare.



As a result of performing a calculation this way, you have the added benefit of creating a surface that can be used to display cut and fill contours or elevation banding to validate earthwork numbers. The following illustration shows an example of a surface style being used to display earthwork cut and fill data by using elevation banding. Colors can be used to indicate cut and fill areas. For example, a color such as dark red could be used to indicate deepest cut, and dark blue could be used to indicate highest fill. AutoCAD Civil 3D can also automatically prepare and insert a legend to define the coloring.



**\*\*Images trademarked by AutoDESK.**